



NIH: Turning Discovery Into Health

The National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services, is the primary Federal agency conducting and supporting medical research. The NIH is the world's leading funder of basic, preclinical, clinical, behavioral, and translational research overall, and of HIV/AIDS research in particular. NIH research has supported virtually every significant advance in biomedical research in the past 50 years, including:

- Vaccines to protect us from cervical cancer, pneumonia, flu, shingles, and meningitis
- Major decreases in deaths from heart disease, stroke, and many forms of cancer
- Advances in the diagnosis and care of Alzheimer's disease, Parkinson's disease, diabetes, asthma, depression, addiction, arthritis, autism, and oral diseases
- Targeted drug therapies that save lives with fewer side effects
- Advances against diseases of the developing world (e.g., cholera and rotavirus)
- Advances in genetic research and individualized medicine
- Stem cell research to study neurological disorders such as Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis (ALS), and spinal cord injury.

The NIH is headquartered in Bethesda, Maryland, United States, just outside Washington, DC. The NIH also has several facilities across the United States and abroad, including facilities in the Rockville, Maryland, area, and the National Cancer Institute Frederick Cancer Research and Development Center at Fort Detrick, in Frederick, Maryland. The National Institute of Environmental Health Sciences' main facility is located in Research Triangle Park, North Carolina. Other laboratory facilities include the NIH Animal Center in Poolesville, Maryland; the National Institute on Aging Gerontology Research Center in Baltimore, Maryland; the Division of Intramural Research of the National Institute on Drug Abuse, also in Baltimore; the National Institute of Allergy and Infectious Diseases Rocky Mountain Laboratories in Hamilton, Montana; and several smaller field stations.

Nearly 6,000 scientists work in NIH intramural laboratories and at the world's largest clinical research hospital, the NIH Clinical Center. Intramural research, however, is only 10 percent of NIH's work. More than 83 percent of NIH funding supports critical research conducted by more than 300,000 personnel at more than 3,000 universities, medical schools, and other institutions in every U.S. state and throughout the world. More than 130 Nobel Prize winners have received support from the NIH.

For more information about the NIH and its programs, please visit <http://www.nih.gov>.

Major Components of the NIH

The Office of the Director is responsible for setting NIH policy and for planning, managing, and coordinating the programs and activities of all the NIH components. The NIH includes 27 research Institutes and Centers, including the NIH Clinical Center, the world's largest clinical research hospital.

Because HIV/AIDS transcends every area of clinical medicine and basic scientific investigation, the NIH AIDS research effort involves every NIH Institute and Center. The Office of AIDS Research, located in the Office of the NIH Director, has primary responsibility for planning and coordinating AIDS research across the NIH.

For information about the Office of the NIH Director, visit <http://www.nih.gov/icd/od>.

For information about Dr. Francis Collins, NIH Director, visit <http://www.nih.gov/about/director>.

Information about the NIH Institutes and Centers can be found at <http://www.nih.gov/icd>.

NIH Intramural Research Program (IRP)

The Intramural Research Program (IRP) is the internal research program of the NIH. With 1,200 principal investigators and more than 4,000 postdoctoral fellows in basic, translational, and clinical research, the IRP is the largest biomedical research institution in the world.

Rigorous external reviews ensure that only the most outstanding research secures IRP funding. The IRP's many scientific accomplishments include the discovery of fluoride to prevent tooth decay; the use of lithium to manage bipolar disorder; and the creation of vaccines against hepatitis, *Haemophilus influenzae* type b (Hib), and human papillomavirus (HPV).

Clinical trials have been a key feature of the IRP portfolio. The program excels in the type of basic research needed to advance biomedical knowledge, providing the foundation for health research worldwide, as well as the type of clinical research that culminates in cures and therapies.

Some IRP clinical trials have tested research concepts so nascent that no scientific literature existed that could support a traditional grant application. In other cases,

the advances arose from years of basic and clinical research only made possible by the equipment, expertise, and research freedom available in the IRP. For example, the National Cancer Institute (NCI) Center for Cancer Research (CCR) has developed a novel vaccine technology, which in turn has led to the first FDA-approved vaccine against cancer. The CCR partnered with private industry to create two vaccines against certain cancerous strains of HPV, which could help to prevent most cases of cervical cancer, as well as genital warts and other types of genital cancer.

Information about the National Cancer Institute Center for Cancer Research is available at <http://ccr.cancer.gov>.

Information about the NIH IRPs can be found at <http://irp.nih.gov>.

Information about IRP clinical trials can be found at the NIH Clinical Research Trials and You Web site at <http://www.nih.gov/health/clinicaltrials>.

To search for a specific IRP clinical trial, visit the NIH Clinical Trials Database at <http://clinicalstudies.info.nih.gov>.

The NIH Clinical Center

An important part of the NIH IRP is the NIH Clinical Center. Opened in 1953 and located on the main NIH campus, the NIH Clinical Center is the world's largest clinical research hospital.

The NIH Clinical Center works to rapidly translate scientific observations and laboratory discoveries into new approaches for diagnosing, treating, and preventing disease. Research at the Clinical Center has led to advances in the development of chemotherapy for cancer; the first use of an immunotoxin to treat a malignancy; identification of the genes that cause kidney cancer and the development of new, targeted treatments for advanced kidney cancer; advances in depression treatment; the first gene therapy; the first

treatment for AIDS; and the development of tests to detect HIV and hepatitis viruses in blood, which led to a safer blood supply.

Currently, about 1,500 clinical research studies are in progress at the NIH Clinical Center. Many focus on rare diseases, which often are not studied anywhere else. Most other studies are clinical trials, predominantly Phase I and Phase II studies, which often are the first tests of new drugs and therapies in people. The Center sees 10,000 new research participants a year, and more than 400,000 clinical research participants from every U.S. state and around the world have been active partners in discovery there to date.

Some 1,200 physicians, dentists, and Ph.D. researchers; 620 nurses; and 450 allied health care personnel work at the NIH Clinical Center. The collaborative environment of the NIH Clinical Center makes it possible for investigators to make referrals for immediate testing and confer with peers across research interests to identify the best approach for diagnosing and treating patients.

Facilities to support patients at the Clinical Center include The Children's Inn (<http://www.childrensinn.org>), open 365 days a year; a school teaching kindergarten

through high school for young patients (http://clinical-center.nih.gov/participate/_pdf/childrensschool.pdf); and the Edmond J. Safra Family Lodge (<http://clinicalcenter.nih.gov/familylodge>) for families and loved ones of adult patients. Other programs of the NIH Clinical Center include a range of clinical research training to help prepare the next generation of clinician-scientists.

For more information about the Clinical Center, visit <http://clinicalcenter.nih.gov>.

The Vaccine Research Center (VRC)

Another key component of the NIH Intramural Program is the Dale and Betty Bumpers Vaccine Research Center (VRC), a part of the National Institute of Allergy and Infectious Diseases (NIAID). The VRC mission is to conduct research that facilitates the development of effective vaccines for human disease. The primary focus of research is the development of vaccines for HIV/AIDS, but the VRC also is working on vaccines for other diseases, including Ebola, Marburg, and influenza.

Activities at the VRC include:

- Basic research to establish mechanisms of inducing long-lasting protective immunity against HIV and other pathogens that present special challenges to vaccine development
- The conception, design, and preparation of vaccine candidates for HIV and related viruses

- Laboratory analysis, animal testing, and clinical trials of such candidates.

The VRC conducts a comprehensive program of research on the NIH intramural campus and works with scientists in academic, clinical, and industrial laboratories through a program of national and international collaborations. The VRC seeks industrial partners for the development, efficacy testing, and marketing of vaccines and focuses on the development of new methodologies and training opportunities that will benefit all HIV vaccine researchers. The potential scientific advances, methodologies, and resources also will provide the basis for research on vaccines for other diseases.

Information about the VRC can be found at <http://www.vrc.nih.gov>.

Additional NIH Clinical Trials Networks

In addition to the series of networks managed by NIAID, several clinical trial networks are supported by key NIH Institutes and Centers that address the intersection of HIV research with the priorities of their portfolio:

- **Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN)** <http://www.nichd.nih.gov/research/supported/atn.cfm>—supported by NICHD, NIMH, and NIDA, develops and conducts behavioral, community-based translational, prophylactic, therapeutic, microbicide, and vaccine trials both independently and in collaboration with existing research networks and individual investigators, in HIV-infected and HIV-at-risk pre-adolescents, adolescents, and young adults up to age 25.
- **AIDS Malignancy Clinical Trials Consortium (AMC)** <http://pub.emmes.com/study/amc/public>—supported by NCI, supports clinical trials for treatment and management of AIDS-related cancers.
- **National Drug Abuse Treatment (NDAT) Clinical Trials Network** <http://www.drugabuse.gov/ctn>—supported by NIDA, conducts studies to develop, validate, refine, and deliver new treatment options for patients in community treatment programs.

The NIH Extramural Research Program

More than 83 percent of NIH funding supports extramural research—critical research conducted off of the NIH campus. NIH-supported extramural research is conducted by more than 300,000 personnel at more than 3,000 universities, medical schools, and other institutions in every U.S. state and throughout the world. Extramural research grants are competitively awarded based on a dual-level peer-review process to new and early-stage investigators as well as to experienced investigators for highly meritorious applications. The NIH offers a variety of research training and career development awards. Small-business research funding opportunities and contract funding opportunities also are available through the NIH Extramural Research Program.

Information about NIH grants can be found at <http://grants.nih.gov>.

The *NIH Guide for Grants and Contracts*, the official publication for NIH medical and behavioral research grant policies, guidelines, and funding opportunities, can be accessed at <http://grants.nih.gov/grants/guide>.

The NIH awards financial support in the form of grants, cooperative agreements, and contracts. This assistance supports the advancement of the NIH mission of enhancing health, extending healthy life, and reducing the burdens of illness and disability. NIH grants support specific research, as well as research-related activities, including fellowships and training, career development, scientific conferences, resources, and construction.

The NIH AIDS Research Program

The NIH conducts and supports a comprehensive program of basic, clinical, translational, and behavioral research on HIV infection and its associated coinfections, opportunistic infections, malignancies, and other complications. AIDS research is coordinated by the Office of AIDS Research and carried out by all of the NIH Institutes and Centers, in both intramural and extramural programs.

The NIH AIDS Research Program:

- Is the largest public investment in AIDS research in the world
- Encompasses all NIH Institutes and Centers
- Comprises a comprehensive program of basic, clinical, behavioral, and translational research on HIV infection, its associated coinfections, opportunistic infections, malignancies, and other complications
- Includes research or training projects in more than 100 countries.

NIH Office of AIDS Research (OAR)

Established in 1988, the NIH Office of AIDS Research (OAR) (<http://www.oar.nih.gov>), a component of the NIH Office of the Director, plans, coordinates, evaluates, and develops the priorities and budget for the NIH AIDS research program. AIDS research represents approximately 10 percent of the total NIH budget—the largest and most significant public investment in AIDS research in the world. Because HIV/AIDS so thoroughly transcends every area of clinical medicine and basic scientific investigation, every NIH Institute and Center plays a role in AIDS research.

The OAR identifies emerging scientific opportunities and public health challenges that require focused attention; manages and facilitates multi-Institute and trans-Institute activities to address those needs; fosters research by designating funds and supplements to pilot program areas; sponsors reviews or evaluations of research programs; facilitates international AIDS research and training; and supports initiatives to enhance the dissemination of research findings to researchers, physicians, institutions, communities, constituency groups, and patients.

Through its annual comprehensive trans-NIH planning, budgeting, and portfolio assessment processes, the OAR sets scientific priorities, enhances collaboration, and ensures that research dollars are invested in the highest-priority areas of scientific opportunity that will lead to new tools in the global fight against AIDS. The NIH HIV Cure Initiative, redirecting \$100 million over 3 years to research toward an HIV cure, and announced by the President of the United States on World AIDS Day 2013, underscores OAR's commitment to the highest-priority research across the NIH.

Each year, the OAR develops the *Trans-NIH Plan for HIV-Related Research* (<http://www.oar.nih.gov/strategicplan>). The Plan establishes the scientific priorities for NIH research and serves as the framework for the development of the annual trans-NIH AIDS research budget. The Plan is developed in collaboration with scientists from the NIH Institutes and Centers, other Government agencies, academic institutions, and nongovernmental organizations, as well as community representatives.

The annual process culminates with the identification of the highest strategic priorities and critical research needs in the areas of Natural History and Epidemiology;

Etiology and Pathogenesis; Microbicides; Vaccines; Behavioral and Social Science; Drug Discovery, Development, and Treatment; Therapeutics; Treatment as Prevention; Training, Infrastructure, and Capacity Building; and Information Dissemination. The Plan also addresses research in special populations, including Women and Girls; Racial and Ethnic Populations; and Research in International Settings. In addition, the Plan highlights the critical area of Research Toward a Cure.

The NIH Office of AIDS Research establishes a unified NIH AIDS research agenda through:

- An annual trans-NIH strategic planning process that identifies the highest scientific priorities and opportunities to address the changing epidemic
- Development of an annual trans-NIH budget, based on the Strategic Plan
- Ongoing trans-NIH coordination, management, and evaluation
- Facilitation and implementation of domestic and international AIDS research collaborations.

Key NIH Institutes and Centers Conducting AIDS Research

National Cancer Institute (NCI)

The National Cancer Institute (NCI) supports and conducts a broad range of research on HIV/AIDS, with a focus on AIDS-associated and non-AIDS-defining malignancies. NCI scientists:

- Co-discovered HIV and proved that the virus causes AIDS
- Developed the first blood test for HIV, which permits diagnosis of the disease and ensures the safety of the blood supply
- Developed or co-developed the first AIDS drugs and conducted the initial clinical trials of these drugs; co-developed darunavir (an HIV protease inhibitor)
- Developed the technology for the first vaccine for HPV, which can protect against cervical cancer (an AIDS-defining cancer) and other cancers.

Although the development of anti-HIV therapy has lowered the incidence of AIDS-defining cancers substantially, the number of non-AIDS-defining cancers has been increasing

as people infected with HIV live longer and the HIV-infected population overall increases in age. Cancer is now one of the leading causes, if not the leading cause, of death for people infected with HIV. The NCI supports a wide range of basic, translational, and clinical research on malignancies associated with HIV infection, including research initiatives to address the increasing number of AIDS-defining malignancies in the developing world.

To learn more about NCI's HIV/AIDS research, please see the Web site of NCI's Office of HIV and AIDS Malignancy at <http://oham.cancer.gov>.

The publication, *HIV/AIDS Research at the NCI: A Record of Sustained Excellence*, can be found at <http://oham.cancer.gov/objects/pdf/brochure.pdf>.

Information about the National Cancer Institute is available at <http://cancer.gov>.

National Eye Institute (NEI)

The NIH National Eye Institute (NEI) supports research on HIV-associated ophthalmic disorders, such as retinitis caused by cytomegalovirus (CMV) infection, and potential therapies for these disorders. Blindness is one of the many complications of HIV infection and AIDS. The NEI also supports studies on the possible development of

ocular toxic effects related to the treatment of HIV infection, as well as research on ocular comorbidities associated with HIV, such as herpes simplex virus.

Information about the National Eye Institute is available at <http://www.nei.nih.gov>.

National Heart, Lung, and Blood Institute (NHLBI)

As the HIV population has aged, we have seen a rise in the prevalence of chronic HIV-related cardiovascular, lung, and blood diseases. The mission of the National Heart, Lung, and Blood Institute (NHLBI) AIDS program is to support and facilitate research and training to address the emerging medical challenges facing the evolving HIV population. The NHLBI is particularly interested in encouraging collaboration among HIV specialists and heart, lung, and blood specialists to further expand knowledge about HIV-associated coronary artery disease,

heart failure, hypertension, sudden cardiac death, smoking cessation, chronic obstructive lung disease, and pulmonary hypertension. In addition, the NHLBI wants to expand research in blood diseases and transfusion medicine. A particular focus is cell-based approaches to eliminate HIV-1, including those based on hematopoietic stem cells, and the elucidation of mechanisms by which such approaches yield sustained or lifelong cure of HIV-1.

Information about the National Heart, Lung, and Blood Institute is available at <http://www.nhlbi.nih.gov>.

National Institute on Aging (NIA)

The National Institute on Aging (NIA) at NIH works to improve the care of older adults with HIV/AIDS. The increasing prevalence of HIV in older Americans is due in large part to the improved survival of individuals receiving therapy and to ongoing new infections in older adults, often as a result of underestimating infection risk for what has historically been considered a “young person’s disease.” In the United States, the rise in HIV incidence among women of color age 50 and older has been especially steep.

Older adults with HIV are at risk of developing a variety of comorbid conditions, including cardiovascular disease, dyslipidemia, insulin resistance, and diabetes.

NIA research addresses aging-related factors that contribute to the pathogenesis, disease progression, treatment, quality of life, and access to care among older HIV-infected individuals. This includes studies on:

- Immune function and host defenses with aging
- Responses to antiretroviral (ARV) treatment in older age
- Metabolic, neurologic, or neuropsychiatric complications of HIV/AIDS in older individuals
- HIV-associated malignancies with aging
- Interactions among HIV infection, treatment, functional status, and frailty
- Care burden and quality of life for HIV-infected elders and their caregivers
- HIV prevention strategies in older adults.

Information about the National Institute on Aging is available at <http://www.nia.nih.gov>.

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) supports epidemiologic, behavioral, and biomedical research to explore the complex and intertwined issues of alcohol abuse and HIV/AIDS. Alcohol use and misuse

increase susceptibility to HIV infection, change early expression of HIV and viral immunity, decrease adherence to ARV medications, and speed disease progression. Alcohol abuse may affect rates of HIV transmission through

both behavioral and biological mechanisms. Alcohol use also plays an important role among individuals aging with HIV. NIAAA supports research to:

- Understand the ecology and clinical epidemiology of alcohol use, abuse, and dependence in HIV-infected populations
- Understand the role of alcohol in disease progression and premature mortality related to co-occurring disease processes such as organ and tissue inflammation and immune response

- Develop and test interventions to decrease risky sexual and substance use behaviors and disseminate interventions in a wide range of settings
- Improve medication adherence in alcohol-using and alcohol-abusing, HIV-infected persons.

Information about the National Institute on Alcohol Abuse and Alcoholism is available at <http://www.niaaa.nih.gov>.

National Institute of Allergy and Infectious Diseases (NIAID)

The National Institute of Allergy and Infectious Diseases (NIAID) is the largest Federal institute for HIV/AIDS research. NIAID conducts and supports an extensive range of basic and clinical domestic and international research to:

- Better understand HIV and how it causes disease
- Find new tools to prevent HIV infection, including a preventive vaccine, microbicide, and treatment as prevention strategies
- Develop new and more effective treatments for people infected with HIV and related coinfections and comorbidities
- Conduct research that can one day lead to a cure for HIV infection.

NIAID-supported investigators have made groundbreaking scientific discoveries that have led to significant progress in the fight against HIV/AIDS. These achievements include:

- Extensive basic research that led to the identification of HIV protease inhibitors, a key component of the powerful combination anti-HIV medications

that drastically reduced the U.S. AIDS death rate and significantly extended the life expectancy of HIV-infected individuals

- Clinical trials that have proven the substantial HIV preventive value of medically supervised, voluntary adult male circumcision; treating HIV-infected pregnant women to prevent virus transmission to infants; daily ARV medication among men who have sex with men and transgendered women at high risk for HIV infection; and administering HIV medicines earlier to HIV-infected individuals when their immune systems are healthier as a way to protect their uninfected heterosexual partners
- The first HIV vaccine to demonstrate a modest protective effect
- The identification of antibodies capable of preventing most HIV strains from latching onto their cellular targets.

Information about the National Institute of Allergy and Infectious Diseases is available at <http://www.niaid.nih.gov>.

National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) supports research on skin immunity and integrity and chronic diseases of muscle and bone related to HIV-associated comorbidities and inflammatory conditions. Advances in degenerative muscle and bone conditions are particularly relevant to an aging HIV/AIDS patient population. NIAMS-sponsored HIV-related research includes studies on:

- Barrier and immune function in skin, which may provide important insights into the ability of HIV to enter the body through mucosal tissues and establish infection
- The molecular mechanisms of muscle degeneration in HIV-infected and aging populations, and how it may be reversed
- The effects of HIV infection, ART, and aging on bones.

In addition, NIAMS manages the Patient-Reported Outcomes Measurement Information System (PROMIS), which is developing new ways to measure patient-reported outcomes, such as pain, fatigue, physical functioning, emotional distress, and social role participation across a variety of chronic diseases.

Information about the National Institute of Arthritis and Musculoskeletal and Skin Diseases is available at <http://www.niams.nih.gov>.

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

The Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) supports and conducts research related to the unique features of HIV infection and AIDS in women, pregnant women, infants, children, adolescents, young adults, and families.

Areas of focus for NICHD research include investigation of the biologic mechanisms of sexual transmission of HIV in the female genital tract; HIV interaction with endogenous and exogenous hormones; demographic and population-based studies related to sexual behavior; the interrelationship between HIV, pregnancy, and contraception; and research on HIV orphans and vulnerable children. In addition, NICHD research addresses:

- Prevention of mother-to-infant transmission of HIV
- The impact of HIV infection and antiretroviral therapy (ART) on growth, sexual maturation, metabolism, neurodevelopment, and the neurologic function of children; and the needs of the increasing numbers of children with HIV who are surviving into adolescence and beyond

- The long-term safety of fetal and neonatal exposure to ARV drugs in HIV-exposed but uninfected children and for HIV-infected women who received drugs during pregnancy and breast-feeding
- The effect of female gender on HIV disease and its treatment
- The pharmacokinetics and safety of new drugs in children, adolescents, and pregnant women
- Strategies to identify adolescents and young adults at risk for HIV infection, increase HIV testing for youth, and link infected youth to medical care
- Interventional research in youth, including primary prevention through both behavioral and preventive vaccine and microbicide research, secondary prevention in clinical management of HIV infection, and tertiary prevention in restoring HIV-infected youth to optimal functioning and well-being.

Information about the Eunice Kennedy Shriver National Institute of Child Health and Human Development is available at <http://www.nichd.nih.gov>.

National Institute of Dental and Craniofacial Research (NIDCR)

The National Institute of Dental and Craniofacial Research (NIDCR) supports studies on the oral manifestations and oral malignancies of HIV/AIDS. HIV-related oral opportunistic infections, coinfections, and malignancies represent early diagnostic indicators of HIV infection, disease progression, immunosuppression, optimal or suboptimal therapies, drug resistance, and treatment compliance. The NIDCR AIDS and Immunosuppression Program supports global, basic, translational, and clinical research, with special emphasis in the following areas:

- Pathogenesis of HIV-related oral complications and cancers due to infections from HIV and oral opportunistic viruses, bacteria, and fungi
- Molecular, cellular, immunological, and genetic mechanisms that facilitate the development of HIV-related oral diseases
- Novel oral therapeutic approaches for people living with HIV/AIDS who are coinfecting with pathogens causing oral lesions, diseases, and oral cancers
- Prevention strategies against oral HIV exposure and transmission and against AIDS-related oral pathogens such as HPV, Epstein-Barr virus (EBV), cytomegalovirus (CMV), herpes simplex virus (HSV), Kaposi's sarcoma-associated herpesvirus (HHV8), *Candida*, and other fungal and bacterial species

- Oral mucosal prophylactic vaccines against HIV and other oral pathogens, oral immunotherapies, oral topical formulations, or biological modifiers to prevent or control infectious diseases
- Immunology, structure, biology, host genetics and epigenetics, physiology, and biochemistry of the oral mucosa regarding susceptibility or resistance to HIV infection, replication, and transmission, and to AIDS-related oral pathogens

- Oral specimen-based diagnostics for HIV and other oral viral, fungal, and bacterial pathogens causing oral lesions and diseases.

Information about the National Institute of Dental and Craniofacial Research and the AIDS Immunosuppression Program is available at <http://www.nidcr.nih.gov>.

National Institute on Drug Abuse (NIDA)

The National Institute on Drug Abuse (NIDA) supports a broad range of research to reduce the spread of HIV among drug abusers and their partners and minimize the associated health and social consequences of the disease. Drug and alcohol intoxication is linked with increased HIV risk behavior, and injection and noninjection drug use continues to contribute significantly to the spread of HIV. NIDA's domestic and international HIV/AIDS research priorities include:

- Conducting research to better understand the etiology, pathogenesis, and spread of HIV/AIDS among drug-abusing populations
- Improving HIV treatment outcomes for drug abusers through a better understanding of interactions between drugs of abuse, HIV therapy, and HIV/AIDS disease
- Understanding the impact of drug treatment as HIV prevention
- Developing the most effective strategies to coordinate and improve treatment and services for HIV, drug abuse, and coinfections (e.g., hepatitis C virus, or HCV)
- Developing prevention strategies that address both injection and noninjection drug use such as stimulants (e.g., methamphetamine, cocaine, and crack) in vulnerable populations
- Using implementation science to identify the most effective and cost-effective prevention strategies in various risk groups and cultures
- Expanding HIV/AIDS treatment as HIV prevention (i.e., seek, test, treat, and retain).

Information about the National Institute on Drug Abuse is available at <http://www.drugabuse.gov>.

NIDA's "Learn the Link" site: <http://hiv.drugabuse.gov/english/learn/overview.html>

National Institute of General Medical Sciences (NIGMS)

The National Institute of General Medical Sciences (NIGMS) supports research to answer critical scientific questions in cell biology, biophysics, genetics, developmental biology, pharmacology, physiology, biological chemistry, biomedical technology, bioinformatics, and computational biology, along with selected aspects of the behavioral sciences.

For 25 years, the NIGMS has supported the structural characterization of HIV enzymes and viral proteins. This support has been instrumental in the development of ARV drug therapies, such as protease inhibitors. The NIGMS continues to support the characterization of viral proteins and is expanding its program to include cellular and viral complexes. In 2007, the NIGMS, along

with NIAID, launched three new research centers to study the biology and life cycle of HIV at the molecular level. The research centers integrate a variety of techniques from cell biology, structural biology, and biochemistry to capture in unprecedented detail the three-dimensional structures of HIV proteins bound to human cellular components, such as proteins or DNA. The structural information will help elucidate how the various components interact and reveal new approaches for disrupting those interactions, potentially leading to new targets for HIV therapies, microbicides, or vaccines.

Information about the National Institute of General Medical Sciences is available at <http://www.nigms.nih.gov>.

National Institute of Mental Health (NIMH)

The National Institute of Mental Health (NIMH) supports a broad range of AIDS-related research on the basic neuroscience of HIV infection, including research to elucidate the mechanisms underlying HIV-induced neuropathogenesis; understand HIV-related motor and cognitive impairments; develop novel treatments to prevent or mitigate the neurobehavioral complications of HIV infection; and minimize the neurotoxicities induced by long-term use of ART. Eradication of the virus from HIV-infected individuals to achieve a cure or a functional cure is a high research priority.

NIMH behavioral science research targets prevention of HIV transmission and acquisition, adherence to interventions to reduce the burden of disease, and studies that address the behavioral consequences of HIV/AIDS. Other priority research areas include:

- Integration of behavioral science with biomedical prevention strategies
- Strategies to increase HIV testing and improve linkage to care and timely treatment initiation

- Development and testing of interventions to improve HIV treatment outcomes through optimal treatment adherence and sustained engagement in care
- Delineation of evolving pathophysiologic mechanisms of HIV-associated neurocognitive disorders (HAND) in the setting of long-term ART, and development of novel therapeutic approaches to mitigate central nervous system (CNS) complications of HIV infection
- The use of state-of-the-art genetic approaches to identify and validate viral and host genetic factors that influence the pathophysiology of HAND
- Delineation and characterization of HIV persistence in the CNS in the context of suppressive highly active antiretroviral therapy (HAART), and foster translational research to enable therapeutic eradication of HIV-1 from the brain.

Information about the National Institute of Mental Health is available at <http://www.nimh.nih.gov>.

National Institute of Neurological Disorders and Stroke (NINDS)

The National Institute of Neurological Disorders and Stroke (NINDS) supports basic, translational, and clinical research on the effects of chronic HIV infection and comorbidities on the central nervous system. NINDS-supported research includes studies of HIV-associated peripheral neuropathy; progressive multifocal leukoencephalopathy (PML); cryptococcal meningitis; cytomegalovirus infection; herpesvirus infections; neuropathy; neurosyphilis; HIV-related psychological and

neuropsychiatric disorders; and the effects of ART on the nervous system. Studies to define and elucidate novel mechanisms of pathogenesis that are driving neurocognitive decline at the intersection of HIV-associated neurodegenerative processes, aging-associated central nervous system disease, chronic HAART treatment effects, and host susceptibility factors also are priorities.

Information about the National Institute of Neurological Disorders and Stroke is available at <http://www.ninds.nih.gov>.

National Institute of Nursing Research (NINR)

The National Institute of Nursing Research (NINR) sponsors domestic and international HIV/AIDS research focused on health promotion, disease prevention, and symptom management, including approaches to reduce HIV risk, develop and implement culturally appropriate HIV prevention education for adolescents, and overcome barriers to prevention in the United States and developing countries. The NINR is focused on research to promote health and quality of life and prevention strategies across the course of HIV/AIDS disease,

particularly in areas of symptom mechanism(s), biobehavioral interventions, prevalence disparity, age-related decisionmaking, and palliative and end-of-life care. These include:

- Studies to manage the physical and psychosocial symptoms associated with HIV infection, its complications, and its treatment, such as frailty, fatigue, wasting, sleep disturbances, pain, cognitive impairment, neuropathies, anxiety, and depression

- Symptom management in comorbid non-AIDS-related conditions in older adults with HIV/AIDS
- Age-appropriate behavioral interventions to increase treatment adherence and prevention strategies
- Underlying factors associated with differential responses to clinical conditions and HIV treatment regimens

- Psychoneurological or biobehavioral interventions to maintain or improve immune competence in HIV-infected persons.

Information about the National Institute of Nursing Research is available at <http://www.ninr.nih.gov>.

National Library of Medicine (NLM)

The National Library of Medicine (NLM) works to translate biomedical research into practice. The NLM's electronic information services deliver trillions of bytes of data to millions of users, including scientists, health professionals, and the public in the United States and around the globe every day. Among the NLM's information resources are:

AIDSinfo (<http://aidsinfo.nih.gov>), a service of the U.S. Department of Health and Human Services (HHS), is managed by the NLM with support from the OAR and NIAID. AIDSinfo offers access to the latest, federally approved HIV/AIDS medical practice guidelines; HIV treatment and prevention clinical trials; and other research information for health care providers, researchers, people affected by HIV/AIDS, and the general public. InfoSIDA (<http://infosida.nih.gov>) is the Spanish-language site of AIDSinfo.

The NLM HIV/AIDS Information page (<http://sis.nlm.nih.gov/hiv/index.php>) provides the latest information on HIV research, treatment, and clinical trials, along with information on HIV diagnosis and testing; prevention; related medical conditions; statistics; and many other HIV-related topics.

The NLM's MEDLINE®/PubMed® (<http://www.ncbi.nlm.nih.gov/pubmed>) is a publicly available database of more than 18 million journal citations from 1948 to the present, which also includes an AIDS-specific subset.

The NLM's PubMed Central® (<http://pubmed.gov>) is a Web-based repository of biomedical journal literature providing free, unrestricted access to more than 1.5 million full-text articles.

MedlinePlus® (<http://www.nlm.nih.gov/medlineplus>) and Medline Plus en español (<http://www.nlm.nih.gov/medlineplus/spanish>), the NLM's main portals for consumer health information, provide comprehensive, up-to-date, easy-to-read information on nearly 800 health topics in English and Spanish. MedlinePlus includes a series of HIV/AIDS-specific pages in both English and Spanish.

ClinicalTrials.gov (<http://www.clinicaltrials.gov>) provides the public with comprehensive information about all types of clinical research studies.

Center for Scientific Review (CSR)

The Center for Scientific Review (CSR) ensures that NIH grant applications receive fair, independent, expert, and timely reviews. The CSR organizes peer-review groups composed of experienced and respected researchers from across the country and abroad who evaluate the majority of NIH grant applications for their scientific merit. These reviews allow the NIH to fund the most scientifically promising research.

All AIDS-related unsolicited grant applications are reviewed by a study section or special emphasis panel within the AIDS and Related Research (AARR) integrated review group, on an expedited cycle mandated by

Congress. AARR reviews grant applications in the areas of basic, translational, clinical, and behavioral aspects of HIV/AIDS research. This includes studies on:

- Molecular biology and virology of HIV and related retroviruses
- Immunology and pathogenesis of HIV and related retroviruses
- Epidemiology and clinical studies of HIV and associated diseases
- AIDS-associated opportunistic infections and cancers
- Discovery, design, and evaluation of therapeutics

- Development of vaccines
- Effects of HIV/AIDS on the nervous system and HIV-associated neurocognitive disorders
- Behavioral and social science approaches to preventing HIV/AIDS

- Behavioral and social consequences of HIV infection and AIDS.

Information about the Center for Scientific Review is available at <http://www.csr.nih.gov>.

Fogarty International Center (FIC)

The Fogarty International Center (FIC) is the NIH's focal point for international cooperation in biomedical research, facilitating the global exchange of ideas and collaborative research. The FIC builds partnerships between health research institutions in the United States and in low- and middle-income countries to support and facilitate basic, clinical, and applied research and research training for investigators interested in addressing the global HIV pandemic.

With co-funding from other NIH Institutes, Centers, and Offices, the FIC has provided 25 years of support to HIV-related research and to the development of multidisciplinary biomedical, behavioral, and social science research capacity for the prevention, care, and

treatment of HIV/AIDS and HIV-related conditions for adults and children in low- and middle-income countries.

The Fogarty HIV Research Training Program strengthens the capacity of researchers and institutions in low- and middle-income countries to conduct HIV-related research in their countries and to compete independently for research funding.

Information about the Fogarty International Center is available at <http://www.fic.nih.gov>.

To learn more about the Fogarty HIV Research Training Program, go to <http://www.fic.nih.gov/Programs/Pages/hiv-aids-research-training.aspx>.

Office of Research Infrastructure Programs (ORIP)

The Office of Research Infrastructure Programs (ORIP), a component of the Division of Program Coordination, Planning, and Strategic Initiatives in the NIH Office of the Director, supports NIH's research infrastructure and research-related resources programs, and coordinates NIH's science education efforts. ORIP's infrastructure programs are designed to ensure that NIH effectively addresses and coordinates important areas of emerging scientific opportunities.

The eight National Primate Research Centers (NPRCs) and other ORIP-funded primate resources provide comprehensive support for investigators engaged in HIV/AIDS research using nonhuman primates, including studies of mechanisms of pathogenesis and development of vaccines and microbicides. ORIP also funds cooperative agreements that support a consortium of specific pathogen-free (SPF) macaque breeding colonies that provide animals to investigators who are studying many aspects of HIV/AIDS.



Illustration ©2012 Visual Science
www.visualsciencecompany.com